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THE UNIVERSITY OF ALBERTA

ATTENTIONAL AND VERBAL DEFICITS IN CHILDREN OF AVERAGE INTELLIGENCE PRENATALLY EXPOSED TO ALCOHOL

(C)

BY

DENISE I. BRYDEN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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IN

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21 Beacon Crescent
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Date: June 27, 1988.

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "Attentional and Verbal Deficits in Children of Average Intelligence Prenatally Exposed to Alcohol", submitted by Denise I. Bryden in partial fulfilment of the requirements for the degree of Master of Education in Educational Psychology.

.....
(Supervisor)

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Date: June 21/88.

DEDICATION

This thesis is dedicated to the memory of my father, Arthur Francis Baril, who taught me, by his example, the virtues of initiative and determination.

ABSTRACT

Investigators gave little consideration to the association between prenatal exposure to alcohol and subsequent learning difficulties in school-aged children until the research of Shaywitz, Cohen, and Shaywitz (1980) which found that "Subtle Central Nervous System impairment in the form of behavioral and learning deficits may occur in children of normal intelligence born to alcoholic mothers" (p.981). The present investigation compares and contrasts the results of the Wechsler Intelligence Scale for Children-Revised (WISC-R) of two such groups of children differentiated by their academic performance to investigate whether deficits in verbal and attending skills are unique to those children experiencing school failure.

The writer compared the Verbal and Performance IQs of each group to test for significance ($p < .05$) and to determine whether the children experiencing academic failure had a significantly lower Verbal IQ than the group who was passing. The Kaufman factor groupings of the WISC-R subtests were used as a model to examine whether the group having academic problems showed more difficulties on those subtests that comprise the Freedom from Distractibility factor, which according to Sattler (1982), measures the ability to attend.

The group experiencing academic failure ($n = 18$) had a mean age of 11.1 and a mean Full Scale IQ of 97.1; the group not

experiencing academic failure (n = 6) had a mean age of 11.7 and a mean Full Scale IQ of 108. Social workers, school counsellors, and teachers referred the subjects. The writer interviewed the parents/guardians, and a psychologist administered the WISC-R.

The subjects having academic difficulties showed a significant difference ($p < .05$) between the Verbal and Performance IQ measures, with the Verbal IQ being lower. Although both groups attained their lowest mean score on the Kaufman Freedom from Distractibility factor, distractibility and hyperactivity were characteristics that were reportedly more common to the children experiencing failure.

The findings suggest that even in the absence of the characteristics commonly associated with Fetal Alcohol Syndrome, attentional and verbal deficits may be impeding the children's academic performance. The need for educators to follow these children for possible learning difficulties is imperative. Raising the level of public awareness of the consequences of maternal drinking during pregnancy is critical.

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CHAPTER I

STATEMENT OF THE PROBLEM

The incompatibility of alcohol and pregnancy has been suspected since Biblical times (Book of Judges, 13:7), but was deemed insignificant during much of the twentieth century. As recently as 1965, Good & Gilman stated in the text Pharmacological Basis of Therapeutics, "The placenta is permeable to alcohol; alcohol gains free access to fetal circulation, but it does not seem to harm the fetus" (p.149).

Within a relatively short period of time, statements such as this were being reevaluated. In 1968, Lemoine, Harousseau, Borteyru, and Menuet conducted a study in France on the offspring of alcoholic mothers. Although they reported physical and behavioral anomalies, their work received little attention outside of that country.

During the early seventies, Ulleland (1972), a pediatrician from Seattle, was involved in examining infants who failed to do well physically and behaviorally despite good postnatal care. Following closer examination of possible contributing factors, maternal alcoholism was tentatively suggested. Ulleland's observations prompted her colleagues, Jones and Smith, to examine more extensively a group of children of alcoholic mothers. Their study eventually led to the formal naming and clinical description of the Fetal Alcohol Syndrome - FAS (Jones & Smith, 1973). See Appendix A for a description of the primary characteristics of FAS.

An Overview of FAS

Although the research of Jones & Smith prompted numerous investigations which have raised the level of public awareness concerning the dangers of drinking during pregnancy, the problem persists because of the social acceptability of the consumption of alcohol. Despite medical warnings of the possible effects, the median estimate cited in Abel (1984) of the "incidence of 'heavy' drinking during pregnancy in the United States is 2%" (p.75). Studies in Seattle, France, and Sweden approximate that the frequency of FAS is 1 of 750 births (Streissguth, Landesman-Dwyer, Martin, Smith, 1980), making it more prevalent than Down Syndrome. The gravity of the problem is further evidenced by the fact that it is the third known cause of mental retardation (Streissguth et al, 1980; Darby, Streissguth & Smith, 1981).

FAS is associated with a distinct pattern of congenital malformations that include "growth deficiency, dysmorphic facial characteristics, central nervous system [CNS] dysfunction..." (Streisguth, 1986, p.43). CNS disorders include behavioral deficits, the most salient of which are "mental retardation, hyperactivity, and poor or delayed motor development" (Abel, 1982, p.133).

Frequently, individuals who do not have the identifiable FAS characteristics are not regarded as having been affected. Several studies report that there may be twice as many children

who could be called partial FAS or fetal alcohol effects - FAE who remain unidentified (Hanson, Streissguth, & Smith, 1978; Olegard et al. 1979; Smith, 1980).

With or without physical malformations, mental retardation of varying degrees has been documented in the majority of reports investigating children prenatally exposed to alcohol. Although it has not been clearly established why some children are affected and others are not, Holzman (1983) indicated that the likelihood of having a child with some alcohol-induced effect increases with the amount of alcohol consumed (p.16). According to Sparks (1984b), "Exposure of the fetus to moderate or higher concentrations of alcohol is known to have differential effects at different stages of development" (p.27). During the first trimester of pregnancy, alcohol may profoundly affect organ development (Holzman). Moreover, Streissguth (1986) suggested that "Maternal and fetal metabolism of alcohol, length of alcoholism, and dose and timing of exposure relative to gestation affect risk in the individual case" (p.46). Variables such as these make the risk level difficult to establish; however, concensus exists that there are deleterious consequences both prenatally and postnatally.

Most investigations of children who have been prenatally exposed to alcohol have focused on children whose intelligence has been seriously impaired and who have the physical anomalies characteristic of fetal alcohol syndrome. Further studies

examining the relationship between maternal drinking during pregnancy and later learning disabilities in school-aged children are viewed by Streissguth (1986) as being critical. The paucity of research in this area may be attributed to the numerous variables that present obstacles to investigations.

Preliminary Research into Children of Normal Intelligence Born to Alcoholic Mothers

Shaywitz, Cohen, and Shaywitz (1980) conducted an investigation that differs from previous studies "by emphasizing that subtle central nervous system impairment in the form of behavioral and learning deficits may occur in children of normal intelligence born to alcoholic mothers" (p.981). They examined the growth, physical characteristics, school performance, and intellectual ability of 15 children who had been referred to a Learning Disorders Unit. They used the Wechsler Intelligence Scale for Children (WISC) as the primary instrument to assess intelligence and found that the mean Full Scale IQ score of their subjects was 98.2. They listed the highest subtests as being Similarities, Comprehension, Object Assembly, and Block Design and the lowest subtests as being Coding, Arithmetic, Digit Span, and Information. They did not, however, give the mean scores of the individual subtests.

Although the school records of the children indicated hyperactivity, distractibility, and short attention span, Shaywitz et al. (1980) did not discuss the possible relationship

between these weaknesses and the children's lowest WISC subtests, three of which comprise the Freedom from Distractibility factor proposed by Kaufman (1975). A description of the Kaufman factor groupings, which consist of Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility, may be found in Appendix B. According to Sattler (1982), "The Freedom from Distractibility factor score measures the ability to remain undistracted" (p.155). In the present investigation, distractibility is defined as a behavioral characteristic commonly associated with hyperactivity, whereby, in the classroom, the child often appears not to be listening and has difficulty paying attention and staying on task (Ross, 1977).

The Shaywitz et al. investigation (1980) indicated that children born to alcoholic mothers should be monitored carefully for possible learning difficulties. Their findings further suggested that behavioral and learning deficits "may occur in children of normal intelligence and may be apparent only when the child must utilize higher cognitive processes to meet academic demands" (p.981).

Attentional and Verbal Deficits

Imperative to the facilitation of higher cognitive processing is the ability to attend and concentrate. According to Kaufman (1979), "Attention, concentration... are necessary requisites for good performance on the third-factor subtests

[Freedom from Distractibility]" (p.84). Deficits in these areas are commonly associated with hyperactivity, which, for the purpose of the present study, refers to "exceedingly active behavior not typical of most children, characterized by restlessness and distractibility" (Sattler, 1982, p.637). Abel (1984) indicated that "As a result of this disorder [hyperactivity], school failure and conduct disorders are not uncommon" (p.141). Hyperactivity is a well-researched consequence of FAS. Studies have not, however, closely examined whether attention and concentration deficits would be evidenced by children of normal intelligence who have been prenatally exposed to alcohol on those subtests of the Wechsler Intelligence Scale for Children-Revised (WISC-R) that comprise the Kaufman Freedom from Distractibility factor.

Children who have attentional deficits are frequently referred to as having a learning disability (Sattler, 1982). The term learning disability is used to describe the child with normal intelligence who is having learning difficulties in basic academic subjects such as reading, arithmetic, and/or writing (Erickson, 1987; Hallahan, Kauffman, 1986). According to Erickson, the deficient skill areas may also include expressive and receptive oral language. Iosub, Fuchs, Bingol, Stone, and Gromisch (1981) observed "frequent speech and language abnormalities in children with FAS, even in the absence of mental retardation" (p.526).

The Verbal Scale of the WISC-R necessitates skills in expressive and receptive oral language. In light of the findings of Iosub et al. (1981), it is likely that when a comparison for significance ($p < .05$) is conducted between the Verbal and Performance IQs, the Verbal IQ score would be lower. Sattler (1982) stated that children who have deficits in the Verbal area "perform more poorly on reading tasks and tasks measuring language expression" (p.403). Because verbal skills are essential for success in school, weaknesses may cause academic problems.

Purpose of the Present Investigation

Frequently, educators have attributed learning difficulties to environmental factors such as social class or child neglect. The research of Shaywitz et al. (1980), however, has shown that behavioral and learning difficulties in children of average intelligence prenatally exposed to alcohol may be "manifestations of CNS involvement" (p.981).

Some children of average intelligence who have been prenatally exposed to alcohol experience academic difficulties, and others do not. The present study examines two groups of children reported to have been prenatally exposed to alcohol. The children are differentiated by their school performance: one group has been reported by the parents/guardians to be having academic difficulties (Reported Academic Difficulties - RAD); the other has been reported not to be having academic

difficulties (No Difficulties - ND).

The purpose of the study is to examine behavioral and learning deficits that may be contributing to some of the academic problems. The writer examines these deficits to determine whether there are characteristics unique to those children who are experiencing academic difficulties. To facilitate a comparison of strengths and weaknesses of the two groups, the WISC-R is administered and the Kaufman factor groupings of the WISC-R are used as a model.

On the basis of the literature, the writer believes that attention and concentration deficits may be influencing the performance of those children who are having academic difficulties, and that these difficulties will be evidenced on those subtests that comprise the Kaufman Freedom from Distractibility factor. The children experiencing no academic difficulties may not show deficits on this factor.

The medical literature frequently mentions speech and language defects in FAS children (Sparks, 1984a). In light of this, it is likely that the children who are having school problems will have more difficulties on the Verbal subtests than on the Performance subtests. In addition, because the Verbal IQ is more closely associated with school performance than the Performance IQ, it is expected that the group experiencing academic difficulties will have lower Verbal and Full Scale IQ scores than the group that is not having problems in school.

Hypotheses

The present investigation is based on the following hypotheses:

1(a) The RAD group will show a significant difference ($p < .05$) on the mean score of those subtests that comprise the Freedom from Distractibility factor when compared to the mean score of those subtests that comprise the Verbal Comprehension factor, with the Freedom from Distractibility factor being lower.

(b) The RAD group will show a significant difference ($p < .05$) on the mean score of those subtests that comprise the Freedom from Distractibility factor when compared to the mean score of those subtests that comprise the Perceptual Organization factor, with the Freedom from Distractibility factor being lower.

2(a) The ND group will show no significant difference ($p < .05$) between the mean score of those subtests that comprise the Freedom from Distractibility factor and the mean score of those subtests that comprise the Verbal Comprehension factor.

(b) The ND group will show no significant difference ($p < .05$) between the mean score of those subtests that comprise the Freedom from Distractibility factor and the mean score of those subtests that comprise the Perceptual Organization factor.

3(a) The RAD group will show a significant difference ($p < .05$) on the mean score of the Verbal IQ measure when compared to the mean score of the Performance IQ measure, with the Verbal IQ being lower.

(b) The ND group will not show a significant difference ($p < .05$) between the mean score of the Verbal IQ and the mean score of the Performance IQ.

4(a) When the mean score of the Verbal IQ measure is compared between the RAD and ND groups, the RAD group's mean score will be significantly lower ($p < .05$).

(b) When the mean score of the Performance IQ measure is compared between the RAD and ND groups, no significant difference ($p < .05$) will be shown.

(c) When the mean score of the Full Scale IQ measure is compared between the RAD and ND groups, the RAD group's mean score will be significantly lower ($p < .05$).

Definition of Terms

For the purpose of the present investigation, the following terms are operationally defined:

attention and concentration deficit or attentional deficit - The mean score of those WISC-R subtests that comprise the Freedom from Distractibility factor is lower than the mean scores of those subtests that comprise the Verbal Comprehension and Perceptual Organization factors.

distractibility - A behavioral characteristic commonly associated with hyperactivity, whereby, in the home and classroom, the child often appears not to be listening and has difficulty paying attention and staying on task (Ross, 1977, p.100).

Fetal Alcohol Effects (FAE) - FAE children are those who are reported to have been exposed to alcohol in utero and have at least one of the primary characteristics of Fetal Alcohol Syndrome as described in Appendix A (Robe 1984, p.43).

hyperactivity - A behavioral disorder "characterized by overactivity, restlessness, and distractibility" (Sattler, 1982, p.637). In the classroom, careless work habits and failure to complete assignments are typical.

verbal deficit - The mean score of those subtests that comprise the Verbal IQ measure are significantly lower ($p < .05$) than the mean score of those subtests that comprise the Performance IQ measure. A verbal deficit indicates weaknesses in verbal receptive/expressive skills.

Subject Groupings:

RAD (Reported Academic Difficulties) - refers to those children who are experiencing failure in at least one academic subject, as reported by their parents/guardians during an interview with the investigator.

ND (No Difficulties) - refers to those children who are not experiencing academic difficulties, as reported by their parents/guardians during an interview with the investigator.

CHAPTER II

REVIEW OF THE LITERATURE

The deleterious consequences of the maternal consumption of alcohol during pregnancy have been suspected for centuries; however, Jones & Smith (1973) and their colleague Streissguth (1978a) must be recognized as being among the first to identify prenatal alcohol exposure as a serious problem warranting investigation. Unfortunately, due to the number of variables, definitive conclusions regarding human studies are difficult to make, and investigators have often turned to animal research where the variables can be more easily controlled. Although it is not the intent of this paper to review the animal studies, an extensive amount of literature does exist. According to Abel (1984) who has reviewed human and animal research:

> There is considerable similarity between the effects of prenatal alcohol exposure in humans and animals with respect to both learning deficits and the "attention deficit syndrome." This similarity suggests that alcohol is indeed a potent behavioral teratogen in humans, and the reported effects noted in this regard are not likely due to other factors related to alcohol ingestion. (p.145)

Although there has been considerable evidence that the maternal ingestion of alcohol during pregnancy can be harmful to the physical and mental development of the fetus, much of the clinical literature of FAS children has been dominated by

detailed accounts of their physical appearance. Some recent Swedish studies are among the few to investigate children with or without the FAS characteristics (Aronson, Kyllerman, Sabel, Sandin, & Olegard, 1985; Kyllerman et al., 1985). Abel (1982) expressed the concern that the literature concentrated on detailed physical descriptions of the fetal alcohol syndrome to the detriment of a comprehensive assessment of the children's behavioral profile. According to Abel, "The most salient and consistent behavioral characteristics reported among FAS children are mental retardation, hyperactivity, and poor or delayed motor development" (p.133).

There is much variability in the data reporting IQ scores of children prenatally exposed to alcohol; however, agreement exists that the most serious behavioral problem is mental retardation. Clarren and Smith (1978) noted that "Although not all persons affected are retarded, rarely has an affected person displayed average or better than average mental ability" (p.1064). Several researchers have observed that the impact on brain dysfunction in FAS is directly related to the severity of the physical features: The more severe the facial characteristics, the greater the likelihood of intellectual handicap (Golden, Sokol, Kuhnert, Bottom, 1982; Iosub, Fuchs, Bingol, Stone & Gromisch, 1981; Jones, Smith, Streissguth & Myrianthopoulos, 1974; Streissguth, Herman, & Smith, 1978b). In a study conducted by Streissguth, Herman, and Smith (1978a) the

children with lesser manifestations of FAS had an average IQ of 82, and those with the most severe manifestations had an average IQ of 55. These findings were later substantiated in a ten year follow-up by Streissguth, Clarren, & Jones (1985). Other studies, however, indicated that children who are affected may have intellectual deficits without displaying any physical signs (Olegard et al., 1979). With or without physical malformations, mental retardation of varying degrees has been documented in the majority of reports investigating children prenatally exposed to alcohol. Although mental retardation is the most debilitating feature, other behavioral problems such as hyperactivity are also a consequence of exposure (Abel, 1984).

Clarren & Smith (1978) found that "Hyperactivity is a frequent component of the fetal alcohol syndrome in young children" (p.1065). A study conducted by Havlicek, Childiaeva, and Chernick (1977) and cited in Abel (1982) on the sleep states among infants born to alcoholic mothers leaves little doubt that the infants do exhibit distinct behavioral characteristics. Even in the absence of the physical anomalies of FAS, the infants were jittery, restless, and irritable compared to the control group (p.135).

The question of whether hyperactivity persists with FAS children into their school years was examined in a longitudinal study by Spohr and Steinhausen (1984). They examined 56 children, twenty-five percent of whom had an IQ that placed

within the average range. They concluded, "Hyperactivity and distractibility seem to be the major handicaps preventing these children from having a normal school career" (p.197). These findings support the earlier research of Steinhausen, Gobel, and Nestler (1984) who performed a follow-up examination after a period of three years and concluded that "A cardinal sympton found in children with FAS, namely hyperactivity, shows no change" (p.468).

Hyperactivity, or the attentional deficit disorder (ADD) as it is now commonly referred to, is a widely researched childhood behavioral problem. Although hyperactivity may occur in children for a variety of reasons, Varley (1984) stated that "Some features of the fetal alcohol syndrome are consistent with ADD" (p.254).

The essential features of ADD according to the Diagnostic and Statistical Manual of Mental Disorders - DSM III (1980) "are signs of developmentally inappropriate inattention, impulsivity, and hyperactivity" (p.41). Although ADD is usually evident by age 3, according to Abel (1984), it frequently remains undiagnosed and is given little attention until the child enters school. As a consequence of this disorder, in the classroom, the child often has careless work habits and fails to complete assignments. In addition, he is easily distracted - he appears not to be listening and has difficulty paying attention and staying on task.

Children who have attentional and academic difficulties are frequently diagnosed as having a learning disability, which according to Erickson (1987), "refers to deficits in specific skills in relation to expected levels of performance" (p.200). As discussed in Chapter I, the deficient skill areas involve basic academic subjects and also include expressive and receptive oral language. Although speech and language disorders of children prenatally exposed to alcohol have been mentioned frequently in the medical literature, they have not been examined extensively. The findings of Iosub et al. (1981) indicated that even in the absence of mental retardation, FAS children frequently evidence "speech and language abnormalities" (p.526).

The literature indicates that language difficulties and behavioral disorders are common to children with a learning disability and have been found in FAS children. The present study investigated a group of children of average intelligence prenatally exposed to alcohol, focusing on their verbal and attention and concentration skills.

Shaywitz et al. (1980) raised the possibility that a number of children may be experiencing school difficulties as a result of prenatal alcohol exposure, yet remain unidentified because they are of average intelligence and do not have the characteristic physical dysmorphology. They conducted a study of 15 children who had been prenatally exposed to alcohol to

examine the extent of FAS features, level of cognitive function, and school performance. The children, ranging in age from 6 to 18 years, showed varying degrees of physical characteristics associated with FAS. Their mean Full Scale IQ on the WISC-R was 98.2, with scores ranging from 82 to 113. It is significant to note that behaviors associated with ADD were common to the majority of the children. They were distractible, had a short attention span, and experienced early school failure. Their findings suggested that behavioral and learning deficits may be manifestations of central nervous system insult that occurred during fetal development.

The Shaywitz et al. study (1980) has broadened awareness of the potential effects of fetal alcohol exposure; however, the problems inherent in human studies are varied and complex and may account for the paucity of research delineating the relationship between this exposure and possible learning difficulties. Abel (1984) cautioned investigators of the many confounding variables to be considered. Frequently, abusers of alcohol are also abusers of nicotine, caffeine, and other drugs. Most of the drugs readily cross the placenta and their interactive effects are not clearly known (Streissguth, 1986, p.33). Age and the overall physical condition of the mother are other possible influences on fetal development. Steinhausen et al. (1984) and El-Guebaly and Offord (1979) suggested that genetic influences and environmental factors as they relate to

the functioning of the family must also be taken into account.

Although it is possible to adjust for potentially confounding variables in human studies, the many intangible aspects involved in the association between pregnancy and alcohol intake further complicate the research. The guilt that surrounds this social problem often leads to denial or inaccurate reporting of both frequency and quantity of alcohol consumed. Objectivity, then, becomes another problem in studies based on self reports or on observations of others.

Despite all the problems that are intrinsic, further studies pertaining to the behavioral and language development of children prenatally exposed to alcohol are essential. Shaywitz et al. (1980) believed that "poor school performance may reflect a learning disability" (p.981) and to this end recognized the need for follow-up of children of alcoholic mothers. Over the years, many studies have investigated the possibility that certain groups of children, especially the learning disabled (LD), could be distinguished from normal groups by their WISC-R subtest performance patterns (Clarizio & Bernard, 1981; Smith, Coleman, Dokecki, & Davis, 1977).

Bannatyne's recategorization of the WISC-R (1974) is one method that is used in the interpretation of this pattern. He proposed to distinguish LD children from those who are not by recombining the subtests into process oriented categories (see Appendix C). The profile of Spatial > Conceptual >

Sequential > Acquired Knowledge has been found for learning disabled children (Clarizio & Bernard, 1981; Smith et al., 1977); however, considerable variations exist due to the heterogeneity of the LD group (Ryckman, 1981).

Factor analysis is another procedure utilized when interpreting the WISC-R Scores. The most commonly used method is the Kaufman (1975) three factor groupings of Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility (see Appendix B). Because the subtests included in the Bannatyne Sequential category are identical to the Kaufman Freedom from Distractibility factor, the Bannatyne groupings are not investigated in the present study. The subtests common to both procedures are Arithmetic, Digit Span, and Coding.

Of particular relevance to the present investigation is the WISC-R profile exhibited by the children in the Shaywitz et al. (1980) study. With the exception of Information, their lowest scores were evidenced on those subtests that comprise the Freedom from Distractibility factor. According to Sattler (1982), "The Freedom from Distractibility score measures the ability to remain undistracted (to attend or concentrate)" (p.155).

On the basis of the literature, the writer believes that children of average intelligence prenatally exposed to alcohol may show deficits in attention and concentration and in

expressive and receptive language skills. The two groups of children in the present investigation have been prenatally exposed to alcohol and are of average intelligence. The main difference between the groups is in their ability to perform academic tasks: One group has experienced academic failure; the other group has not. Verbal and attentional deficits may be impeding the academic performance of those children reported to be experiencing academic failure and could be differentiating them from the children who have been exposed to alcohol in utero, but are not experiencing school difficulties.

CHAPTER III

METHODS

Referral Process

The present study represents a part of an investigation that examined children prenatally exposed to alcohol. The sensitivity that surrounds the issues pertaining to the maternal consumption of alcohol during pregnancy poses problems in finding a sample. The majority of the subjects were found through personal contacts with social workers, school counsellors, and teachers. In addition, the Adoptive Parent Association Newsletter (see Appendix D) and a radio talk show were used as sources. Interested parents/guardians contacted the investigators who explained to them the purpose of the project and the criteria for the referral of their child.

Subjects

The subjects who participated in the investigation (N = 24) were chosen according to common characteristics. Although there are many variables inherent to human studies that are difficult to control, the following were controlled in the present investigation. The children had reported histories of prenatal exposure to alcohol. The background information pertaining to the maternal consumption of alcohol during pregnancy was given to the adoptive or foster parents by the social worker, verbally and/or through written reports. In addition, the subjects were within the average range of

intellectual ability and were school-aged.

The majority of the subjects were from adoptive or foster homes. For information concerning the level of mobility for each subject, based on the number of home placements prior to this study, see Appendix E. The children attended classes in a regular school setting. Of the 24 subjects, 18 were reported by their parents/guardians to be experiencing academic difficulties (RAD), and 6 were reported to be experiencing no academic difficulties (ND).

The subjects in the RAD group (n = 18) ranged in age from 7 to 12 years. Their parents/guardians described them as being extremely active, restless, and/or easily distracted. Six of the children were receiving special assistance in a learning disabilities class.

The subjects in the ND group (n = 6) were between 9 and 14 years of age. Four were reported to be more active, restless, and/or distractible than the average child.

PROCEDURES

The subject selection, interviews, and administration of the WISC-R were conducted during a ten month period.

Interview

The writer scheduled a 60-minute interview with the children's parents/guardians. Information obtained consisted of personal, medical, and developmental histories; social emotional development; and educational background. The writer asked a

variety of questions to facilitate a better understanding of the child. Areas of particular relevance to the present study are: evidence of prenatal exposure to alcohol, level of hyperactivity and distractibility, academic standing, and special program needs. The information was recorded in handwritten form and later compiled on a summary sheet, a copy of which is found in Appendix F. All interviewees were advised that there was no obligation to answer any questions that made them uncomfortable. They were also informed that a written summary of their child's test results would be forwarded to them. To ensure anonymity, each child was assigned a file bearing an identification number.

Data Collection

Following the initiation of a referral, each child was scheduled to be seen by a psychologist for the administration of the WISC-R, which is currently the most popular test to assess children's intellectual ability (Kaufman, 1980). Sattler (1982) describes the WISC-R as "an extremely well-standardized test, with adequate validity and excellent reliability" (p.165). Based on the age groups ranging from 6-0 to 16-11 years, the reliability coefficients are .96 for the Full Scale IQ, .94 for the Verbal Scale IQ, and .90 for the Performance Scale IQ (Sattler, 1982). A description of the individual WISC-R subtests is found in Appendix G.

The standardized procedures found in the WISC-R manual (1974) for the administration and scoring were followed. The

Verbal and Performance batteries were administered to each child in a quiet, comfortable room during a 60 to 75 minute time period. Mazes, the Supplementary Performance Subtest, was not administered. All of the WISC-R data were later verified by a supervising psychologist who entered the results and observations into the subject's file.

Data Analysis

The investigator used the scaled scores of the WISC-R subtests in the statistical analysis of the data. Using the Kaufman model to test the first and second hypotheses, the writer compared the Freedom from Distractibility factor to both the Verbal Comprehension and Perceptual Organization factors for each of the two groups. This was conducted to investigate whether a significant difference ($p < .05$) would be shown on the mean score of the Freedom from Distractibility factor when compared to the mean score of each of the other two factors.

To examine the third hypothesis, the writer compared the Verbal and Performance IQ measures for each of the two groups to determine whether a significant difference ($p < .05$) would exist.

The fourth hypothesis was examined by comparing the mean scores of the Verbal, Performance, and Full Scale IQ measures between the RAD and ND groups to test for significant differences ($p < .05$).

To further investigate possible reasons why some children

who have been prenatally exposed to alcohol have academic difficulties, an additional comparison was conducted. The mean scores of the subtests administered to the RAD group were ranked from highest to lowest with the corresponding mean scores of the ND group to enable a comparison between the two groups. Because the Shaywitz et al. investigation (1980) did not report the mean scores of the subtests, but gave the highest and lowest subtest rankings, a direct comparison with the RAD and ND groups could not be made. A comparison was done, however, between the Shaywitz et al. and the RAD groups based on these rankings.

The ANOVAR procedure was used for the analysis of the WISC-R data. This operation carries out an analysis of variance with repeated measures and was employed to compare the means of the various subtests groupings proposed by Kaufman (Appendix A). Following this method, the Scheffe was used to test for the significance of mean differences ($p < .05$). The t test was also conducted to investigate whether a significant difference would exist ($p < .05$) between the Verbal and Performance IQ measures for each group. In addition, it was used to test for significance ($p < .05$) between the mean scores of the RAD group and the ND group on the Verbal, Performance, and Full Scale IQ measures.

CHAPTER IV

RESULTS

The subjects in the RAD group who had a mean age of 11.1 attained a Full Scale IQ ranging between 82 and 112 (M = 97.1). The subjects in the ND group had a mean age of 11.7 and a Full Scale IQ ranging between 100 and 121 (M = 108). The subjects' ages and IQ measures are found in Table 2.

Hypothesis 1(a) was not supported by the results of the Scheffe. The RAD group's mean score on the Freedom from Distractibility factor showed no significant difference ($p < .05$) when compared to the mean score of the Verbal Comprehension factor. Hypothesis 1(b) was substantiated. The results of the Scheffe indicated that the mean score of those subtests that comprise the Freedom from Distractibility factor was significantly lower than the mean score of those subtests that comprise the Perceptual Organization factor ($F(2,15) = 23.097$, $p < .05$).

Hypothesis 2(a) was supported by the results of the Scheffe for the ND group. Their mean score on the Freedom from Distractibility factor showed no significant difference ($p < .05$) when compared to the mean score of the Verbal Comprehension factor. Hypothesis 2(b) was not substantiated, however, by the Scheffe. A significant difference was indicated between the mean score of those subtests that comprise the

Freedom from Distractibility factor and the mean score of those subtests that comprise the Perceptual Organization factor ($F(2,15) = 23.097$, $p < .05$). See Table 3 for the mean scores of the Kaufman factor groupings and Table 4 for a summary of the Analysis of Variance for the two groups.

Table 2

Means and SD of the RAD and ND Groups for Age and for Verbal, Performance, and Full Scale IQ Measures

Group							
RAD (n = 18)				ND (n = 6)			
	IQ				IQ		
C.A. Age (Years)	V	P	FS	C.A. Age (Years)	V	P	FS
13.7	82	85	82	12.3	95	105	100
13.3	92	128	109	11.4	107	104	105
12.5	81	114	98	12.5	100	126	112
7.3	92	102	96	9.3	105	104	104
14.1	82	101	90	9.8	108	130	121
9.8	82	84	88	14.8	106	106	106
11.4	98	112	105				
12.5	91	92	95				
10.6	80	92	85				
10.3	88	106	96				
11.3	80	93	85				
11.3	96	123	109				
10.3	81	88	84				
9.1	98	102	100				
9.1	107	101	104				
11.9	103	96	100				
9.5	109	114	112				
11.8	100	121	110				
$\bar{X}$ = 11.1 yrs.	91.22	103.00	97.11	11.7 yrs.	103.50	112.50	108.00
SD = 1.78	9.77	13.27	9.80	2.0	5.01	12.10	7.46

Table 3

Mean Scores and SD of the RAD and ND Groups Using Kaufman Factor Groupings

	Group					
	RAD			ND		
	n	$\bar{X}$	SD	n	$\bar{X}$	SD
Verbal Comprehension	18	9.014	1.968	6	11.042	0.954
Perceptual Organization	18	10.861	2.108	6	12.417	2.035
Freedom from Distractibility	18	7.981	1.736	6	8.778	0.911

Table 4

Analysis of Variance Using the Kaufman Three Factor Groupings of Verbal Comprehension, Perceptual Organization, and Freedom from Distractibility for the RAD and ND Groups

Source	Sum of Squares	df	Mean Square	Ratio	Prob.
RAD (n = 18)					
*S-Within	109.05	17.	6.42		
*A-(RAD)	76.62	2.	38.31	15.60	0.001**
AS-Within	83.50	34.	2.46		
ND (n = 6)					
*S-Within	12.21	5.	2.44		
*A-(ND)	40.52	2.	20.26	11.78	0.002**
AS-Within	17.20	10.	1.72		

* $p < .5$ ** $p < .01$

*S - Subjects

*A - Group

To test the third hypothesis, the writer examined whether a significant difference ($p < .05$) existed between the Verbal and Performance IQ measures for each group. Hypothesis 3(a) was supported in that the results of the t test indicated that the Verbal IQ measure of the RAD group was significantly lower (t (17) = -4.09, $p < .01$). Hypothesis 3(b) was also substantiated because no significant difference ($p < .05$) was shown between the Verbal and Performance IQ scores of the ND group.

To test the fourth hypothesis, the writer examined the mean scores of the Verbal, Performance, and Full Scale IQ measures to determine whether a significant difference ($p < .05$) existed when identical measures were compared between the RAD and ND groups. Hypothesis 4(a) was verified. The results of the t test indicated that the RAD group's mean score on the Verbal IQ measure was significantly lower than the ND group's (t (22) = 2.92, $p < .01$). Hypothesis 4(b) was corroborated because a comparison between the mean scores of the Performance IQ measures for both the RAD and ND groups indicated no significant difference ($p < .05$). Hypothesis 4(c) was supported because the RAD group's mean score on the Full Scale IQ measure was significantly lower than the ND group's (t (22) = 2.48, $p < .01$).

Because the present investigation was prompted by the Shaywitz et al. study (1980), the writer compared the subjects

in the present study with the Shaywitz children who had a mean Full Scale IQ of 98.2, yet were experiencing academic difficulties. The findings indicated that the RAD group's mean Full Scale IQ of 97.1 was similar (see Table 2).

The mean scores of the WISC-R Subtests for the RAD group are ranked from high to low in Table 5. To facilitate a comparison of the mean score rankings, the corresponding subtest means for the ND group are also shown. The highest and lowest subtest groupings for the children in the Shaywitz et al. study (1980) are noted in Table 6. Because the Shaywitz study did not report the mean scores of the subtests, a statistical comparison of identical subtests was only possible between the RAD and ND groups. The results of the t test indicated that the RAD group's mean score was significantly lower on the Similarities subtest (t (22) = 2.70, $p < .01$) and on the Information subtest (t (22) = 2.52, $p < .01$). See Table 7 for the Analysis of Variance Summary.

Table 5

WISC-R Subtest Mean Scores of the RAD Group Ranked From High to Low and the Corresponding Mean Scores of the ND Group

	Group				
	RAD (n = 18)		ND (n = 6)		
Variable	$\bar{X}$	SD	$\bar{X}$	SD	p
Object Assembly	11.56	2.92	12.83	3.37	
Picture Completion	10.94	2.26	12.17	2.48	
Picture Arrangement	10.56	2.92	12.17	2.64	
Block Design	10.39	3.41	12.50	2.81	
Comprehension	9.50	2.62	10.50	1.52	
Coding	9.39	2.48	9.33	1.97	
Vocabulary	9.28	2.45	10.83	1.17	
Similarities	9.00	2.79	12.33	1.97	**
Information	8.28	2.08	10.50	.84	**
Arithmetic	7.33	1.68	8.83	.75	
Digit Span	7.22	2.98	8.17	2.14	
Verbal IQ	91.22	9.77	103.50	5.01	**
Performance IQ	103.00	13.27	112.50	12.10	
Full Scale IQ	97.11	9.80	108.00	7.46	**

* $p < .05$ ** $p < .01$

Table 6

The High and Low WISC-R Subtest Groupings of the Shaywitz Group (n = 15)

High	Low
Similarities	Coding
Comprehension	Arithmetic
Object Assembly	Digit Span
Block Design	Information

Table 7

Analysis of Variance Comparing Mean Scores of the II WISC-R Subtests Between the RAD and ND Groups

Source	Sum of Squares	df	Mean Square	F Ratio	Prob.
*A	114.39	1.	114.39	5.44	0.029*
*S-Within	462.82	22.	21.04		
*B	379.73	10.	37.97	7.69	0.001**
AB	33.18	10.	3.32	0.67	0.750
BS-Within	1086.57	220.	4.94		

* $p < .5$ ** $p < .01$

*A - RAD (n = 18) and ND (n - 6) Groups

*B - 11 WISC-R Subtests

*S - Subjects

CHAPTER V

SUMMARY AND DISCUSSION

The present investigation examined two groups of children of average intelligence, prenatally exposed to alcohol, and differentiated by their academic performance. The purpose was to investigate whether attentional and verbal deficits were unique to the children experiencing school failure.

Evaluation and Interpretation of the Findings

The writer hypothesized that the RAD group would have a significantly lower mean score ($p < .05$) on the Freedom from Distractibility factor when compared to the mean scores of both the Verbal Comprehension and Perceptual Organization factors. The Freedom from Distractibility factor was significantly lower than the Perceptual Organization factor, but was not significantly lower than the Verbal Comprehension factor. According to the hypothesis, the ND group would not show a significant difference when a similar comparison was made. This was not supported because they attained results similar to the RAD group.

Although both group's lowest mean scores were on the Freedom from Distractibility factor, it is significant to note that all of the RAD subjects' parents/guardians reported them as being extremely active, restless, and/or easily distractible, whereas 33% of the ND group did not. In Abel's discussion (1984) of hyperactivity or the attentional deficit disorder in

children prenatally exposed to alcohol, he stated that difficulties such as impulsivity and focusing attention are common and that "as a result of this disorder, school failure and conduct disorders are not uncommon" (p.141).

The hyperactivity and distractibility as reported by the parents/guardians and the attentional deficits as evidenced on the Freedom from Distractibility factor appear to be adversely affecting the academic performance of the children in the RAD group. According to Shaywitz et al. (1980), these behavioral deficits impede higher cognitive processing, which is necessary for the child "to meet academic demands in a classroom situation" (p.981).

The writer further hypothesized that the RAD group's mean score on the Verbal IQ measure would be significantly lower ($p < .05$) than the mean score on the Performance IQ, and that the ND group would not show a significant difference between the two measures. Both were corroborated by the results, thereby showing a distinction between the RAD and ND groups. According to Kaufman (1979):

> The Verbal and Performance IQs reflect a child's performance on real and meaningful dimensions of mental ability. Thus the discrepancy between these IQs may well suggest important differences in the child's learning style and the ability to handle different types of stimuli. (p.23)

As indicated, the RAD group scored significantly lower ($p < .05$) on the Verbal IQ, which is associated with receptive and expressive oral language skills. Although it has not been extensively investigated, Iosub et al. (1981) noted "frequent speech and language abnormalities in children with FAS, even in the absence of mental retardation" (p.526).

In Erickson's discussion of receptive and expressive oral language, she stated that deficits may reflect a learning disability, which is indicated by deficiencies "in specific skills in relation to expected levels of performance" (1987, p.200). According to Sattler (1982), the Verbal Scale indicates "scholastic aptitude" (p.597), and children who show deficits in this area "perform more poorly on reading tasks and tasks requiring language expression" (p.403). It would appear, therefore, that academic difficulties experienced by the children in the RAD group are being influenced by deficits evidenced on the Verbal IQ Scale.

Another difference between the two groups became apparent when a statistical comparison was conducted to determine whether the RAD group would, as hypothesized, have significantly lower ($p < .05$) Verbal and Full Scale IQs than the ND group. No significant difference was expected between the two groups on the Performance Scale. These hypotheses were supported by the analysis of the data. It is evident that the RAD group's lower Full Scale IQ was influenced by its Verbal IQ. In Sattler's

discussion of the Full Scale IQ, he indicated that it "is a global estimate of the child's level of cognitive ability" (1982, p.193). As previously discussed, higher cognitive processing is necessitated as the academic demands increase (Shaywitz et al., 1980, p.981). It is, therefore, reasonable to conclude that the RAD group would experience more difficulties on academic tasks.

To further investigate why some children who have been prenatally exposed to alcohol experience academic difficulties, a comparison was conducted between the RAD and Shaywitz et al. (1980) groups. Mean Full Scale IQ scores, academic difficulties, hyperactivity, and distractibility were common to both. When the WISC-R subtests were ranked from highest to lowest for each of the groups, the lowest common subtests were Information, Digit Span, and Arithmetic. The latter two subtests, which comprise part of the Freedom from Distractibility factor, are indicators of attention and concentration and have been discussed earlier in this chapter. Although these two subtests also ranked lowest for the ND group, the group's mean score on the Information subtest was significantly higher ($p < .05$) than the RAD group's. According to Sattler (1982), the Information subtest is influenced by knowledge acquired in school. Because the children in the ND group are attaining passing grades, this discrepancy is to be expected.

The findings of the present investigation indicate that a number of factors are contributing to the RAD group's difficulties in school. Although the writer investigated the number of home placements that the children were in prior to this study, level of mobility does not appear to be influencing school performance because only 39% of the subjects in the RAD group placed in the high to very high category compared to 67% of the children in the ND group (see Appendix E).

Relation of the Present Investigation to Previous Studies

Children who have been prenatally exposed to alcohol may have behavioral disorders and learning deficits (Shaywitz et al., 1980; Spohr and Steinhausen, 1984). Shaywitz et al. (1980) expressed the concern that the problems these children are experiencing have too frequently been attributed to environmental factors, without any consideration given to the possibility of a learning disability (p.981). Streissguth (1986) stressed the need to examine the relationship of maternal drinking during pregnancy and later learning disabilities in school-aged children.

In the present study, it was found that the RAD group shares characteristics with the learning disabled population. Because the RAD group is similar to the Shaywitz et al. group (1980), the findings of the present investigation corroborate those of Shaywitz et al. who believed that "poor school performance may reflect a learning disability" (p.981).

Limitations of the Study and Implications for Future Research

There are many aspects that the researcher must consider when examining the complex association between pregnancy and alcohol intake. Variables such as age and the overall physical condition of the mother; use of caffeine, nicotine, and other drugs; and frequency and quantity of alcohol consumed are difficult to control and were not in the present study. Because guilt often accompanies this social problem, the biological mother usually avoids involvement in research. The present investigation depended upon sources such as social workers and/or adoptive or foster parents. Future research could involve biological mothers who are enrolled in an alcohol-rehabilitation program. This group would likely be more willing to disclose relevant facts concerning the variables in an effort to abet research.

A future study should involve a greater number of subjects to facilitate a confirmatory factor analysis of the WISC-R data, which was not possible in this investigation. In addition, to enable a comparison between level of intellectual ability and level of academic achievement, the administration of the WISC-R, in conjunction with a standardized battery of achievement tests, should be considered. A behavior rating scale should be used to examine more closely the association between behavioral disorders and learning deficits in children of average intelligence exposed to alcohol in utero.

Although language development of the children in the present study was not specifically examined, the WISC-R results indicated that the RAD group's Verbal IQ was significantly lower ($p < .05$) than its performance IQ. Because the Verbal measure is associated with expressive and receptive oral language skills, and Iosub et al. (1981) observed "frequent speech and language abnormalities in children with FAS" (p.526), the possibility exists that the RAD group had delayed language development. Further studies of the speech and language development of children prenatally exposed to alcohol are, therefore, important.

Practical Applications of the Findings

Educators are becoming more familiar with the deleterious consequences of maternal drinking during pregnancy. Nevertheless, because much of the research has focused on the physical and mental anomalies, children of average intelligence who do not have the characteristics commonly associated with FAS are frequently overlooked. The results of the WISC-R administered to the subjects in the present investigation indicated deficits in verbal receptive/expressive skills and in attention and concentration skills. Children who have weaknesses in these areas often have difficulty in a classroom situation. It is imperative, therefore, that educators are made aware that children may be affected even though they do not display the characteristic dysmorphology of FAS.

The parents/guardians of children prenatally exposed to alcohol must be counselled to understand that even in the absence of the typical physical and mental characteristics, these children may have academic problems, and school personnel should be alerted. When school personnel have been informed, it is important that they initiate a referral for an intellectual, academic, and behavioral assessment. Should problems be found, labelling should not occur; rather, learning strategies should be taught to assist the child in coping with the deficits. Although the teaching of learning strategies is beneficial to all children, in the case of those with learning difficulties, it is of paramount importance.

The general public should also be made more aware of the effects of alcohol on the developing fetus through such methods as seminars, media reports, and pamphlets. It is especially important for people who are studying for the helping professions such as social work, nursing, and teaching to be given detailed information concerning this issue. In particular, medical doctors must stress abstinence of alcohol to expectant mothers, and teachers must promote awareness among youth.

Conclusion

The stages involved in learning are complex and numerous. So, too, are the factors that often impede the process. One such factor is exposure to alcohol in utero. Although the

incompatibility of alcohol and pregnancy has been suspected since Biblical times (Book of Judges, 13:7), Jones and Smith with the help of their colleague, Streissguth, are credited as being the first to identify "prenatal alcohol exposure as a serious health risk to the developing fetus" (Abel, 1984, p.25). Shaywitz et al. (1980) were among the first to suggest that "Subtle Central Nervous System impairment in the form of behavioral and learning deficits may occur in children of normal intelligence born to alcoholic mothers" (p.981). Their study further suggested that these children "should be followed carefully through the early school years for the possibility of learning difficulties..." (p.978).

The present investigation compared and contrasted the WISC-R results of two groups of children, prenatally exposed to alcohol, and differentiated by their academic performance. The results indicated that although both groups attained their lowest mean scores on the Freedom from Distractibility factor, the children who were experiencing failure were reported by their parents/guardians as being hyperactive and/or distractible, whereas 33% of the children who were passing were not. The analysis of the data also showed that the group having academic difficulties scored significantly lower ($p < .05$) on the Verbal IQ than on the Performance IQ, thereby influencing their Full Scale score. The other group did not show a significant difference between the Verbal and Performance IQ

measures. Because attention and concentration skills and verbal skills are of primary importance on school related tasks, deficits in these areas impede the learning process.

Although the differences between the two groups are not extreme, one group is experiencing academic failure, and the other is not. The findings indicate that attentional and verbal deficits are influencing the failure. It is possible, however, that other variables such as environmental factors and age at the time of apprehension may also be contributing and could be considered in a future study. Further investigations examining the relationship between maternal drinking during pregnancy and later academic difficulties in school-aged children are deemed critical. In addition, the public must be made more aware that abstinance of drinking during pregnancy is the solution to this preventable problem.

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APPENDIX A

Characteristics of Fetal Alcohol Syndrome - FAS

FAS is associated with a distinct pattern of congenital malformations. The primary characteristics are: prenatal and postnatal growth deficiencies; physical malformations including small head size, decreased eye development, joint, limb, and cardiac anomalies; and behavioral/cognitive impairment such as fine motor dysfunction and mental retardation (Abel, 1980, p.29). The Fetal Alcohol Study Group of the Research Society on Alcoholism has proposed that there must be evidence of the three primary characteristics before a diagnosis is made (Rosett, 1980).

Appendix B

Kaufman's Factoral Groupings of the WISC-R Subtests

VERBAL COMPREHENSION:	Vocabulary, Information, Comprehension, and Similarities
PERCEPTUAL ORGANIZATION:	Block Design, Object Assembly, Picture Completion, and Picture Arrangement
FREEDOM FROM DISTRACTIBILITY:	Arithmetic, Digit Span, and Coding

Appendix G

Bannatyne's WISC-R Categories

SPATIAL:	Picture Completion, Block Design, and Object Assembly
CONCEPTUAL:	Comprehension, Similarities, and Vocabulary
SEQUENTIAL:	Arithmetic, Digit Span, and Coding
ACQUIRED KNOWLEDGE:	Information, Arithmetic, and Vocabulary

APPENDIX D

Fetal Alcohol Syndrome Project - FASP*

Do you know a child with FAS?

We are trying to find out more about the school experiences of FAS children, both to assist schools to provide better programs and to give parents more information on what to expect from their FAS children. The team consists of Mrs. Denise Bryden, an experienced school counsellor and Dr. Elizabeth Blowers, an associate professor of Special Education and adoptive mother of five. We will be assisted by graduate students.

We hope to find about 25 to 30 school-age, diagnosed FAS children, and in February and March of 1986, will administer intellectual, reading, copying, memory, and language tests to the children. In addition, Mrs. Bryden will discuss with parents their children's past and present behaviours and experiences which may influence school performance. We hope to schedule meetings on weekends at the Faculty of Education Building, University of Alberta.

All information will be kept strictly confidential. Parents will receive a written summary of the results of their child's test. A report on the FASP will be made available through the Adoptive Parent Association.

To find out more about the FASP please call Dr. Blowers at 432-3741 and if she is unavailable, mention FASP and leave your name and number.

Let's find out more about our children.

* Article from the Adoptive Parent Association Newsletter, January, 1986.

APPENDIX E

Table E-1

Level of Mobility for Each Subject in the RAD and ND Groups*

Group									
RAD (n = 18)					ND (n = 6)				
C.A. (Years)	Very High	High	Med	Low	C.A. (Years)	Very High	High	Med	Low
7-3				x	9-4				x
9-1				x	9-9	x			
9-1				x	11-5	x			
9-6				x	12-3		x		
9-10			x		12-6	x			
10-3	x				14-9				x
10-4			x						
10-7	x								
11-0				x					
11-4		x							
11-4	x								
11-5	x								
11-11				x					
12-6	x								
12-6		x							
13-4			x						
13-8				x					
14-1				x					
Total	5/18	2/18	3/18	8/18		3/6	1/6	0/6	2/6
Percentage	28%	11%	17%	44%		50%	17%	0%	33%

* Level of mobility is based on the number of placements since apprehension:

Very High - more than one placement per year
High - one placement yearly
Medium - one placement each two years
Low - one placement each three or more years

Appendix F

Summary of Interview

Identification _____ Birthdate _____ Chronological Age _____

Evidence of prenatal exposure to alcohol _____

A. PERSONAL HISTORY:
Age of apprehension _____
Legal status: wardship _____ adopted _____ biological family _____
Presently living in: group _____ foster _____ adoptive _____ other _____
Age when entered present placement _____
Time spent in present placement _____
Present placement: permanent _____ temporary _____ treatment _____
Probable future placement, if present placement not permanent:
group home _____ adoptive family _____ foster _____
biological family _____ other _____
Number of placements _____ in _____ years.
Level of mobility: very high _____ high _____ medium _____ low _____
(very high - more than 1 placement per year since apprehension; high - 1 placement yearly; medium - 1 placement each 2 years; low - 1 placement each three or more years since apprehension)

Comments: _____

B. MEDICAL HISTORY:
Present height _____ weight _____
Problems associated with: heart _____ skeletal structure _____
feeding _____ digestion _____ allergies _____ seizures _____ sleep disturbances _____ abnormal genitalia _____ vision _____ hearing _____
palate _____ teeth _____ microcephaly _____ enuresis _____
encopresis _____ hospitalizations _____
medications - past _____ present _____

Other _____

C. DEVELOPMENTAL HISTORY:
Speech _____ Speech therapy _____ Gross motor _____
Self-care _____

D. SOCIAL-EMOTIONAL DEVELOPMENT: - respondent _____
Indicate if trait is H - High _____; A - Average _____; L - Low _____
Aggression _____ Relating to: adults _____ children _____ organized work habits _____
Following directions _____ Irritability _____ *Distractibility _____
*Hyperactivity _____
Need for approval _____ Self-care and responsibility _____

E. EDUCATION: number of schools attended _____ in _____ years
Mobility (schools attended; years in school). Very high (7:6 or more) _____; High (5:6 & 6:6) _____; Medium (3:6 or 4:6) _____; Low (2:6 or 1:6) _____
Present class _____ Grades repeated _____
Previous placement(s) in special education - class _____ for _____ years
Present reported academic problems: reading _____ math _____
spelling _____ writing _____

Other _____

Summary

	Strengths	Limitations
Reported	_____	_____
Observed	_____	_____

* See definitions p.10.

Appendix G

Description of WISC-R Subtests (Sattler, 1982)

Verbal Scale Subtests:

INFORMATION: The child is required to answer questions that sample a broad range of general knowledge. Rationale: general range of information, alertness to the environment, and long term memory

SIMILARITIES: The child is required to perceive the common elements of paired words. Rationale: abstract thinking ability (memory may be involved)

ARITHMETIC: The child is required to concentrate on selected parts of the questions, then must perform a mental computation to solve the problem within a time limit. Rationale: Concentration and attention in conjunction with knowledge of the basic arithmetical operations of addition, subtraction, multiplication and division

VOCABULARY: The child is required to explain orally the meaning of words that are arranged in order of increasing difficulty. Rationale: learning ability, fund of information, memory, concept formation, and language development (This subtest is the best measure of g in the verbal scale.)

COMPREHENSION: The child is required to answer questions that deal with a variety of problem situations, involving subjects such as one's body, interpersonal relations, and social mores. Rationale: possession of a certain amount of practical

information, ability to draw on past experiences in reaching solutions to a variety of situations that involve a grasp of social conventionality

DIGIT SPAN: The child is required to listen to a series of digits of increasing length and then is expected to repeat them. There are two parts to the subtest comprising of Digits Forward and Digits Backward. Rationale: short-term memory, attention and concentration

Performance Scale Subtests:

PICTURE COMPLETION: In a timed situation, the child is required to discover the essential missing portion from a series of pictures. Rationale: ability to differentiate essential from nonessential detail, concentration, reasoning, visual organization, and visual memory

PICTURE ARRANGEMENT: The child is required to place a series of pictures in a logical sequence within a designated time. Rationale: ability to comprehend and size up a total situation, anticipate the consequences of situations, and interpret social situations.

BLOCK DESIGN: In a timed situation, the child is required to use blocks to assemble a design that is identical to the one shown. Rationale: ability to perceive, analyze, and synthesize forms by breaking down a whole into its component parts and then assembling them into the identical design (The Block Design Subtest is the best measure of g among the performance scale

subtests.)

OBJECT-ASSEMBLY: The child is required to assemble pieces of a puzzle to correctly form common objects within a given time. Rationale: perceptual organization and visual-motor coordination.

CODING: The child is required to copy symbols that are paired with other symbols within a time limit. Rationale: ability to learn an unfamiliar task involving speed and accuracy of eye-hand coordination, attention skills, and short-term memory